

Old Budbrooke Road/Warwick Parkway Station Access Junction – LinSig Assessment

Introduction

- 1.1 Vectos Microsim (VM) have been commissioned by Warwickshire County Council (WCC) to undertake a junction assessment of the Old Budbrooke Road/Warwick Parkway Station access junction. The testing relates to the impact of the proposed residential development in Budbrooke, to the west of Warwick. The key objective of this assessment is to establish how the junction operates with an additional 130 residential dwellings located within Budbrooke.

Scenarios Assessed

- 1.2 Three scenarios will be tested within this assessment. These scenarios will be tested during the AM and PM peak hours (0800-0900 and 1700-1800). The details of the scenarios tested are provided below:

Scenario 1 - 2015 Base Scenario

- 1.3 Initially a 2015 Base scenario has been developed for testing. The traffic flows for inclusion within the Base scenario have been derived from a 2005 traffic survey at the junction. These survey counts have then been 'growthed' via the application of a localised unadjusted TEMPRO growth figure, which represents growth between 2005-2015. Additionally, all of the 2005 surveyed flows into and out of the station access have been doubled, based upon statistical analysis by the Office of Rail and Road (ORR).

Scenario 2 - 2015 'With Development' Scenario

- 1.4 For the purposes of this scenario, the development flows for the original proposed residential development within Budbrooke have then been extracted from the Warwick and Leamington Wide Area Local Plan Paramics Model. The number of trips exiting the residential site, and routing through the Old Budbrooke Road/Warwick Parkway Station access junction has been established from the Paramics model. The trips have then been added to the newly created 2015 Base scenario matrix, to create the 2015 'With Development' scenario.

Scenario 3 - 2015 Sensitivity Test Scenario

- 1.5 Additional to the 2015 With Development scenario, a 'Sensitivity Test' has been undertaken. This scenario assesses the impact of delivering 130 additional dwellings at the proposed development site within Budbrooke. In order to derive the number of trips this amount of dwellings would generate, the WCC standard residential trip rates have been used. These trips have then been distributed as per the trip assignment for the proposed site within the Paramics model. This has enabled a matrix to be created for trips associated with the 130 additional dwellings, which has been added to the matrix levels created for Scenarios 1 and 2 to create the 2015 Sensitivity Test scenario.

Methodology

- 1.6 For the purposes of this assessment 'Linsig' software has been used. LinSig is used to indicate the performance of a signalised junction under a given set of traffic flows. The software calculates the 'degree of saturation' (DoS), expressed as a percentage, for each approach to a junction. Any approach where the DoS is forecast to exceed 90% are highlighted in red in the assessment table to indicate that these approaches are close to or over-capacity. Alongside this, the 'mean maximum queue' (MMQ), is calculated, to represent the average position of the furthest vehicle from the stop line in each cycle.
- 1.7 The 'practical reserve capacity' (PRC) for the junction as a whole is also calculated, which reflects the spare capacity across the junction for additional traffic. A positive PRC figure indicates that the junction has spare capacity whilst a negative PRC suggests that the junction is over capacity and will experience congested conditions.

Results Analysis

- 1.8 The scenarios described above have been tested in a LinSig model for this junction. The results for each scenario, in both the AM and PM peak are summarised in Table 1.

Table 1 Assessment Table

Approach	Scenario 1		Scenario 2		Scenario 3	
	Q's	DoS %	Q's	DoS %	Q's	DoS %
AM Peak Hour Assessment						
A - Old Budbrooke Road N	17.4	90.9	20.1	95.5	24.6	100.3
B - Rail Station Access	1.3	29.6	1.3	29.6	1.3	29.6
C - Old Budbrooke Road S	18.5	93.7	23.3	98.3	25.7	99.7
D - Overflow Car Park Access	0.0	0.0	0.0	0.0	0.0	0.0
PRC (%)	-4.1%		-9.2%		-11.4%	
PM Peak Hour Assessment						
A - Old Budbrooke Road N	14.9	79.7	15.9	82.7	16.6	83.7
B - Rail Station Access	6.0	76.5	6.0	76.5	6.8	83.6
C - Old Budbrooke Road S	8.5	77.3	9.2	80.9	9.6	82.7
D - Overflow Car Park Access	0.5	8.9	0.5	8.9	0.5	9.2
PRC (%)	12.9%		8.8%		7.6%	

- 1.9 The results for Scenario 1 indicate that the junction operates at capacity during the AM and within capacity during PM peak periods. During the AM peak the degree of saturation on both the north and south Old Budbrooke Road approaches is around 90%, which suggest that the junction is operating close to capacity, whilst the negative PRC results also support this. The modelling results suggest that the junction available capacity during the PM peak.
- 1.10 With the inclusion of the additional demands in Scenario 2, the junction continues the level of queuing and the degree of saturation results increase, across both peaks in this scenario. The increase in the AM takes the Old Budbrooke Road approaches close to capacity at 95.5% degree of saturation on both the north approach and 98.3% on the south. The PRC results also suggest that the additional demands will increase congestion at the junction during the AM peak. During the PM peak the junction continues to operate well within capacity in this scenario, with a PRC value suggesting additional traffic in this scenario can be accommodated without issue.
- 1.11 With the inclusion of the Sensitivity Test demands in Scenario 3, the AM peak begins to reach capacity on the Old Budbrooke Road north and south approaches to the junction, however

this situation does not differ significantly from Scenario 2. The modelling results show a degree of saturation of 100.3%, and queues of around 25 pcu's on the northern approach. The PRC value of -11.4% also suggests that the junction is operating at capacity during the AM peak in this scenario. The Old Budbrooke Road S approach operates over capacity in this scenario, with a degree of saturation of 99.7%

- 1.12 The results for the PM peak demonstrate that the junction operates well within capacity on all approaches, with the additional demands accommodated without significant impact on the junction operation.

Summary

- 1.13 This junction assessment has revealed that with the proposed additional 130 dwellings included, the junction will operate at capacity during the AM peak, and it is likely that congestion will develop, with queues on the busiest approach of around 18 vehicles. The results however suggest that the junction operation does not differ significantly between Scenario 2 and 3.
- 1.14 The results indicate that the junction operates well within capacity during the PM peak with the inclusion of the 130 additional dwellings.
- 1.15 Upon reflection it is considered that this assessment represents a robust assessment, with the pedestrian stages at the junction called every cycle. In reality it is unlikely this will be the case, with the pedestrian stages being called frequently whenever a train arrives at the Warwick Parkway Station, and less frequently between train arrivals. On this basis it is likely that additional capacity will exist at the junction than has been modelled.
- 1.16 Additionally the level of growth applied to the 2005 count data, to create the 2015 base demands, is also considered robust, given that recent traffic counts undertaken in 2013 at the A4177 Birmingham Road/Old Budbrooke Road junction, to the north of the study area, reveals little to no growth between 2005 and 2013 at this location. Therefore it is likely that the level of growth applied to through traffic within this junction assessment may in fact be over-estimating the level of traffic. A further assessment of the LinSig model has been undertaken with the 2005 traffic counts for this junction included for the Old Budbrooke Road through traffic, without being factored up to 2015 levels. The resulting output brings

the degree of saturation down from 100.3% to 93.3% on the busiest approach (Old Budbrooke Road N).

- 1.17 Finally this assessment includes traffic flows from the end of Local Plan period in Scenario 2, and it is likely that more detailed traffic flows will be available once further detail on this proposed site is available in due course.
- 1.18 On the basis of the above it is likely that there is more capacity available at this modelling exercise has demonstrated.